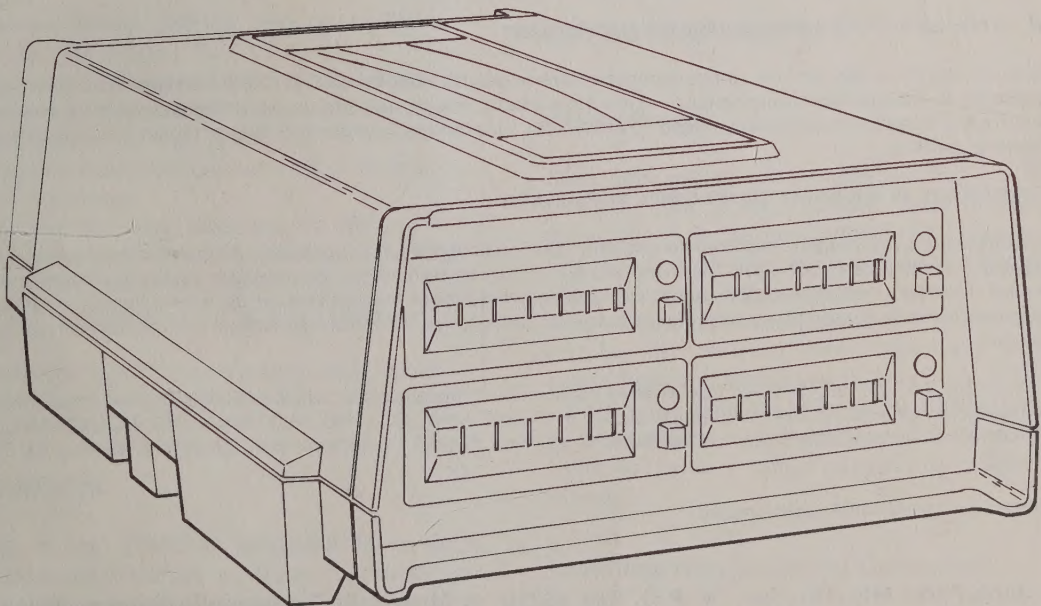




Instruction Manual

Model Y2002

Alarms Output



LIMITED WARRANTY

The JOHN FLUKE MFG. CO., INC., warrants each instrument it manufactures to be free from defects in material and workmanship under normal use and service for the period of one year from date of purchase. This warranty extends only to the original purchaser. This warranty shall not apply to fuses, disposable batteries (rechargeable type batteries are warranted for 90 days), or any product or parts which have been subject to misuse, neglect, accident or abnormal conditions of operations.

In the event of failure of a product covered by this warranty, John Fluke Mfg. Co., Inc., will repair and calibrate an instrument returned to an authorized Service Facility within one year of the original purchase; provided the warrantor's examination discloses to its satisfaction that the product was defective. The warrantor may, at its option, replace the product in lieu of repair. With regard to any instrument returned within one year of the original purchase, said repairs or replacement will be made without charge. If the fault has been caused by misuse, neglect, accident or abnormal conditions of operations, repairs will be billed at a nominal cost. In such case, an estimate will be submitted before work is started, if requested.

ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS SHALL BE LIMITED TO A PERIOD OF TWELVE MONTHS FROM THE DATE OF PURCHASE. THE FOREGOING WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS OR ADEQUACY FOR ANY PARTICULAR PURPOSE OR USE. JOHN FLUKE MFG. CO., INC. SHALL NOT BE LIABLE FOR ANY SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES, WHETHER IN CONTRACT, TORT OR OTHERWISE.

NOTE: Some states do not allow limitations on how long an implied warranty lasts, or the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

If any fault develops, the following steps should be taken:

1. Notify the John Fluke Mfg. Co., Inc. or nearest Service facility, giving full details of the difficulty, and include the Model number, type number, and serial number. On receipt of this information, service data or shipping instructions will be forwarded to you.
2. On receipt of the shipping instructions, forward the instrument, transportation prepaid. Repairs will be made at the Service Facility and the instrument returned, transportation prepaid.

SHIPPING TO MANUFACTURER FOR REPAIR OR ADJUSTMENT

All shipments of John Fluke Mfg. Co., Inc., instruments should be made via United Parcel Service or "Best Way"™ prepaid. The instrument should be shipped in the original packing carton; or if it is not available, use any suitable container that is rigid and of adequate size. If a substitute container is used, the instrument should be wrapped in paper and surrounded with at least four inches of excelsior or similar shock-absorbing material.

CLAIM FOR DAMAGE IN SHIPMENT TO ORIGINAL PURCHASER

The instrument should be thoroughly inspected immediately upon original delivery to purchaser. All material in the container should be checked against the enclosed packing list. The manufacturer will not be responsible for shortages against the packing sheet unless notified immediately. If the instrument is damaged in any way, a claim should be filed with the carrier immediately. (To obtain a quotation to repair shipment damage, contact the nearest Fluke Technical Center.) Final claim and negotiations with the carrier must be completed by the customer.

The John Fluke Mfg. Co., Inc. will be happy to answer all application or use questions, which will enhance your use of this instrument. Please address your requests or correspondence to: JOHN FLUKE MFG. CO., INC., P.O. Box 43210, MOUNTLAKE TERRACE, WASHINGTON 98043, Atten: Sales Dept. For European Customers: FLUKE (Nederland) B.V., Zevenheuvelenweg 53, Tilburg, The Netherlands.

* For European customers, Air Freight prepaid.

John Fluke Mfg. Co., Inc. • P.O. Box 43210 • Mountlake Terrace, Washington 98043

INTRODUCTION

The Y2002 Alarms Output provides for the setting of four separate limit values for comparison with the displayed reading on a 2180A or a 2190A Digital Thermometer. Separate alarm LEDs, one associated with each limit setting, will be activated when the thermometer's displayed reading exceeds the set limit value. Each limit also controls a relay with rear panel connections; any one of the four limit positions can thereby be used to perform on/off control of external equipment. Either the 2180A or 2190A Digital Thermometer is capable of supporting one Y2002 Alarms Unit.

SPECIFICATIONS

Specifications for the Y2002 are listed in Table 1.

Table 1. Y2002 Specifications

The Y2002 Alarms Output indicates up to four high and/or low out-of-limit temperature readings with one LED annunciator per limit. Also activates up to four relays, one relay per limit, for control of remote equipment.

Relays: Four Form C (SPDT), latching or non-latching, switch-selectable. Unlatched with front panel RESET pushbutton.

Relay Contact Ratings: 230 VA, 184V dc or 130V ac rms max, 2A max resistive.

Relay Connectors: Rear panel screw terminal block.

Limit Selections: Four sets of thumbwheels, one for each limit. High or low limit thumbwheel, + or - polarity thumbwheel, and four temperature thumbwheels, 1° resolution.

Accessory Bus: Rear panel receptacle plus 46 cm cable with connector. Y2002 must be located between 2180A or 2190A and any multipoint selector.

Power: 250 mW, supplied by 2180A or 2190A via Accessory Bus.

Size and Weight: Style C case, 1.8 kg (4 lbs.), typical.

INSTALLATION

Installation of the Y2002 is facilitated by a single electrical connection and by a standard portable test instrument (PTI) case. All communications and power requirements on the Y2002 are supported by the accessory bus. Connections to the bus are made with an accessory bus cable to prior units on the bus or with an output jack to succeeding units. The accessory bus cable plugs into the accessory connector of the 2180A or 2190A Digital Thermometer. The Y2002 output jack will accept the connector from a Y2000 RTD selector or Y2001 Thermocouple Selector.

NOTE

The Y2002 accessory bus cable may be plugged into only the 2180A or 2190A ACCESSORY CONNECTOR. Do not plug it into the Y2000 or Y2001 ACCESSORY CONNECTOR.

The Y2002's PTI case allows for a vertically connected stack of instruments (such as the 2180A or 2190A Digital Thermometer and the Y2000 RTD Selector). Use the following procedure when attaching PTI type cases to each other:

1. For the top instrument, pull out the latches found on either side of the case.
2. Nestle top and bottom cases together.
3. Push latches in to attach cases.

OPERATING FEATURES

Control and terminal locations for the Y2002 Alarms Output unit can be found on Figure 1. Table 2 will then detail respective functions.

OPERATING NOTES

Alarm Relays

Each limit setting will be associated with a limit relay. When a limit is not exceeded, relay common (C) is connected to the normally closed (NC) contact. When a limit is exceeded, relay common will be connected to the normally open (NO) contact. Separate terminal blocks for each set of relay connections (C, NC, NO) are located on the rear panel. Figure 2 illustrates alarm relay connections and terminal block locations. When making connections, insert the appropriate wire into the C, NO, or NC terminal slot and tighten the associated screw. Refer to Table 1 (Specifications) for relay maximum ratings.

Latching/Non-Latching Operation

Each channel on the Y2002 will also have a latched-non-latched slide selector switch. In the non-latched position, a reading transition on the 2180A or 2190A Digital Thermometer from in excess of limit back to within limit will cause limit indications to clear. The limit LED will go out, and the limit relay will connect C to NC. In the latched position, such a transition will not cause the limit indications to clear; press RESET instead.

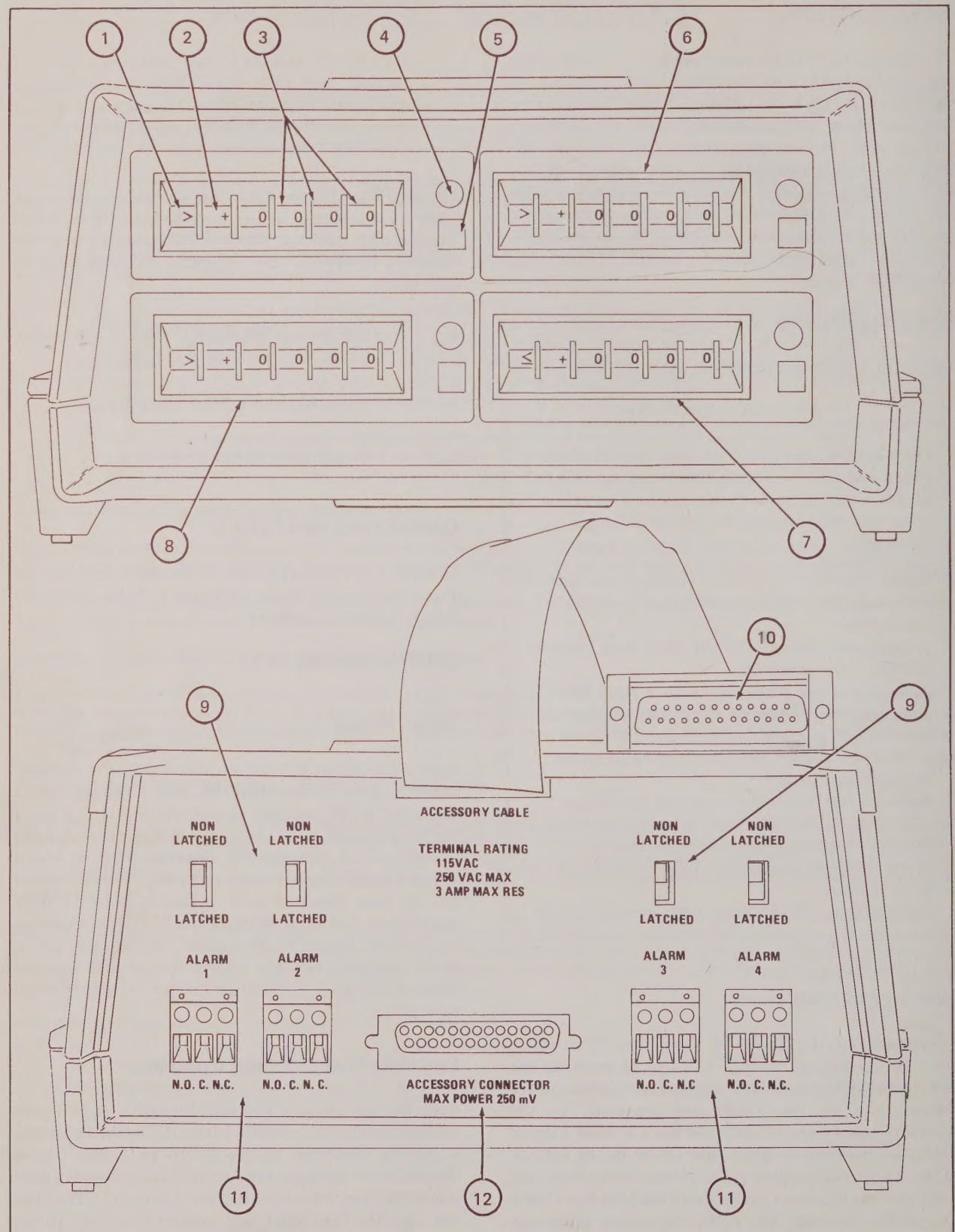


Figure 1. Y2002 Controls, Indicators and Connectors

Table 2. Y2002 Controls and Connectors

ITEM NO.	NAME	FUNCTION
1	Condition Switch	Allows for setting of alarm condition relative to a thermometer input. Alarm will be set if the thermometer reading is either $>$ or $\leq$ the set limit.
2	Polarity Switch	Allows for setting of limit value polarity.
3	Limit Value Switches	Sets the limit value from 0000 through 9999. No decimal point.
4	Alarm LED	Comes on when set limit is exceeded.
5	Reset Switch	Used to clear previous alarm conditions.
6, 7, 8	Other Alarm Point Controls, Indicators	Identical operation and indication as for Limit 1.
9	Latching Switches	In the non-latched position, a thermometer reading transitioning from alarm back within limits will cause alarm indications to extinguish. In latched position, alarm indications will not extinguish; RESET must be pressed instead.
10	Accessory Bus Cable	Connects the Y2002 to the Digital Thermometer's ACCESSORY CONNECTOR.
11	Alarm Relay Connections	Screw tightened terminals connect C to NO (Normally Open) and C to NC (Normally Closed) for control of external devices. Separate alarm relays 1-4 correspond to front panel limits 1-4.
12	Accessory Connector	Used to connect Y2002 to succeeding units on the Accessory Bus. (Accepts another unit's accessory bus cable.)

Setting Limits

Limit selection on the Y2002 consists of relative condition and four digit value settings. The relative condition will determine the relationship that the digital thermometer's reading must have to the limit value for an alarm to be set. If a reading greater than the limit setting is to cause an alarm condition, set $>$. If a reading less than or equal to the limit is to cause an alarm condition, set $\leq$. The four digit value may be set to any desired number. The least significant digit will always correspond to the 1° ($^{\circ}\text{C}$ or $^{\circ}\text{F}$) digit on the associated thermometer.

Controlling External Devices

Any one of the four limit positions may be used to control external devices. The alarm relays may be utilized as in the following example. Refer to Figure 2 when connecting the Y2002 as a controller.

1. Set the relay to non-latching mode (rear panel switches for each limit).
2. Connect the equipment to be controlled (typically a power contactor or relay) to the relay output terminals C and NC (normally closed).
3. Set the limit thumbwheel to the desired temperature and relative condition ($>$ or $\leq$).
4. Whenever the measured temperature is exceeded, the Y2002 relay will activate, connecting output terminals C to NO (normally open), and removing power from the equipment under control.
5. When the measured temperature returns below the limit setting, the alarm relay will return to the NC state and cause power to be reapplied to the equipment.

OPERATING DIRECTIONS

Insure that the Y2002 is properly connected to either the 2180A or 2190A Digital Thermometer as described under

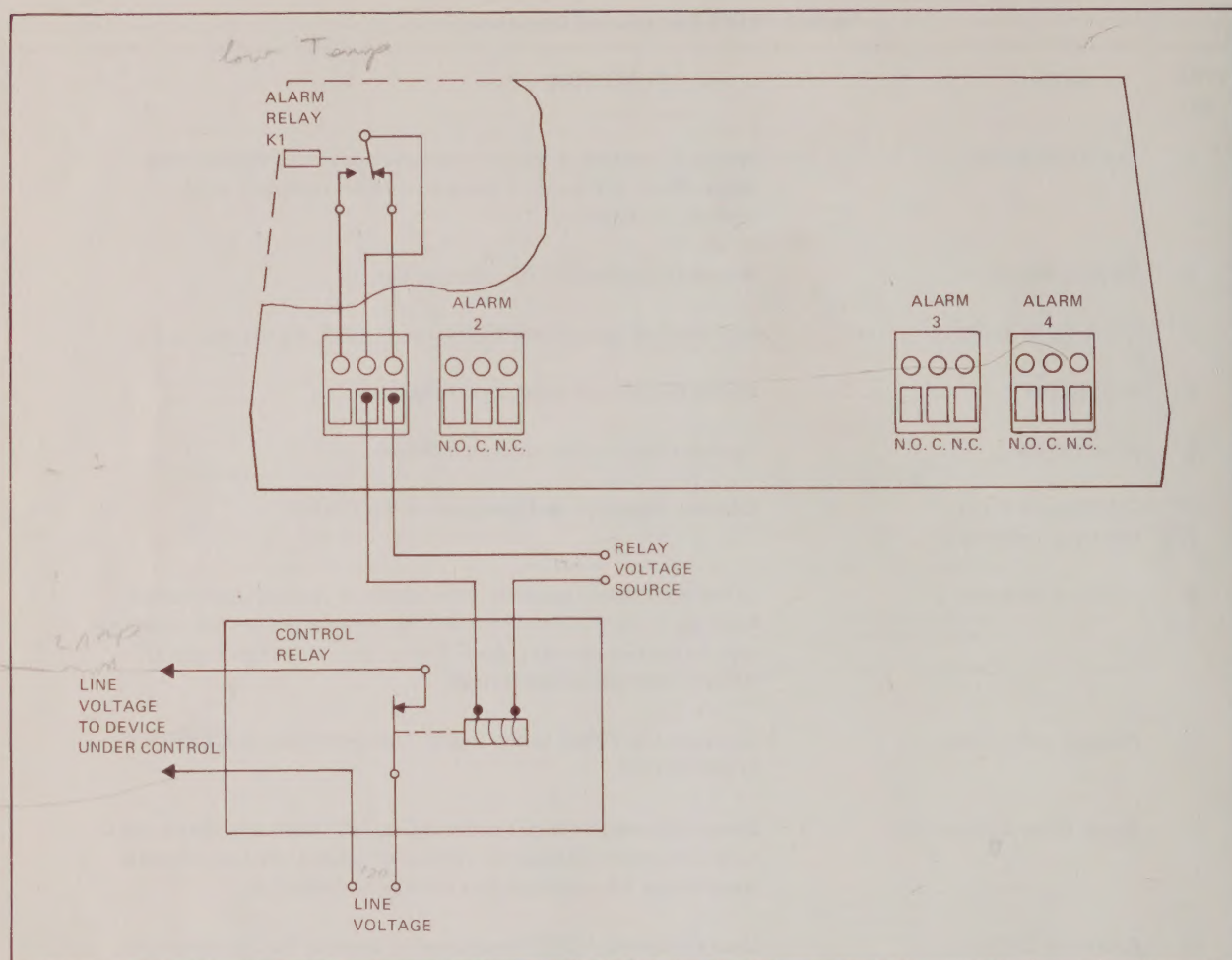


Figure 2. External Control Connections

INSTALLATION. Use the following procedure to operate the unit.

1. Set latch-non-latched selector switches for each alarm point.
2. Set alarm points to required conditions and values.
3. Press power ON (2180A or 2190A).
4. Depress reset buttons to clear any previous alarms.

THEORY OF OPERATION

The Y2002 Alarms Output unit is a four point alarms setting and indicating device. This unit is designed to be used with the 2180A or 2190A Digital Thermometer, either of which will compare the Y2002's numeric limit setting to its own temperature reading. Readings in excess of the manually set limits will identify an alarm

condition. This condition, sent back to the Y2002, will be expressed as an LED indication. Separate alarm relays for each limit switch setting will also energize when alarmed by the thermometer.

External connections to the Y2002 are limited. The serial Accessory Bus supplies all power requirements and communications with the thermometer. The only other connections are contained in separate terminal blocks for each of the four alarm relays.

Each alarm point on the Y2002 is viewed by the associated thermometer as a separate device with its own bus address (8, 9, 10, or 11). The following paragraphs will describe how alarms input and output conversations are controlled. Refer to Figure 3 during the following circuit description.

Addressing

Each of the Y2002's four alarm points has a separate address. A correct address will parallel load the status of

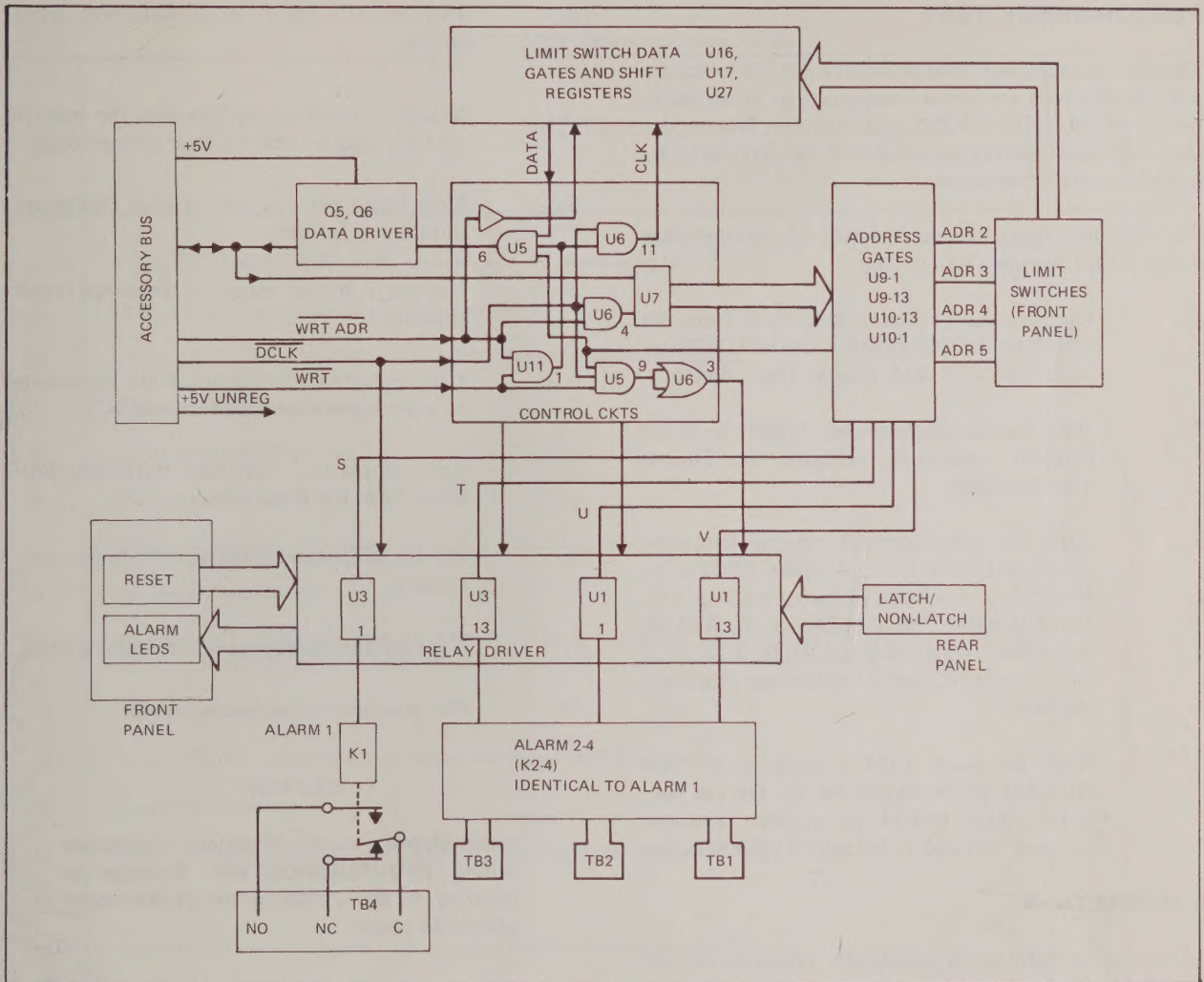


Figure 3. Simplified Schematic

one of the alarm point's switches into shift registers and enable associated relay driver latches. To initially receive the address, $\overline{\text{WRT ADR}}$ line is set low. The address is then applied on the $\overline{\text{DATA}}$ line while the $\overline{\text{DCLK}}$ line is toggled. Address information is thereby clocked into shift register U7. If this information matches an alarm point address, signal line S, T, U, or V will go low. This condition will in turn enable one of the four alarm point thumbwheel switch commons. Switch status information from one of the alarm points is thereby applied to shift registers U16, U17, and U27. When $\overline{\text{WRT ADR}}$ transitions from low to high, the switch status information will be loaded into the shift registers. Signals S, T, U, or V will also enable one of the relay driver latches (U3-1, U3-13, U1-1, or U1-13).

Reading Data from the Y2002

Data will be unloaded from the shift registers (U16, U17, U27) when three conditions are met: $\overline{\text{WRT}}$ and $\overline{\text{WRT}}$

$\overline{\text{ADR}}$ lines high, and $\overline{\text{DCLK}}$ toggled for each bit of data. Alarm point data will then be sent through the data driver circuit (Q5, Q6) to the externally connected thermometer.

Writing Data to the Y2002

The 2180A or 2190A Digital Thermometer, having received data from the alarm point, will now compare that data with the current temperature and decide whether or not to set an alarm condition. The alarm condition, in the form of one bit of output, will be applied to the $\overline{\text{DATA}}$ line when $\overline{\text{WRT ADR}}$ is high, $\overline{\text{WRT}}$ is low, and $\overline{\text{DCLK}}$ is toggled. This $\overline{\text{DATA}}$ line alarm will be clocked into the addressed relay driver latch in one of two circumstances: if the latched-non-latched switch is in the non-latched position, or if the switch is in the latched position and the relay driver latch output is low.

PERFORMANCE TEST

The performance test verifies instrument performance and may be used for initial acceptance, or as an aid in troubleshooting. If the Y2002 Alarms Input fails to pass this test, the troubleshooting should be performed by qualified service personnel.

Use the following procedure to verify correct operation of the Y2002 Alarms Output unit:

1. Connect the Accessory Bus Cable from the Y2002 to ACCESSORY CONNECTOR on the 2180A or 2190A Digital Thermometer.
2. With thermocouple probe (2190A) or RTD (2180A) connected, energize the Digital Thermometer.
3. After the thermometer's reading has stabilized, set LIMIT 1, 2, 3, 4 on the Y2002 to $>$, (polarity of reading), (value of reading +1). Verify that the LIMIT LEDs are off. With an ohmmeter, verify that ALARM 1, 2, 3, 4 connections NC and C on the rear panel are shorted.
4. Now set each LIMIT sign to $\leq$. All ALARM LEDs should be on. On the rear panel, there should be a short between contacts NO and C for each ALARM relay.

CALIBRATION

There are no calibration procedures required for the Y2002 Alarms Unit.

TROUBLESHOOTING

Static discharge can damage components contained in the Y2002. The following precautions should be observed when conducting adjustments or repairs with the instrument's top cover removed.

1. Never conduct repairs without first disconnecting the ACCESSORY CABLE and the ACCESSORY CONNECTOR.

2. Perform all repairs at a static-free work station.
3. Minimize handling of IC's and the pcb; in no case handle them by their connectors.
4. Keep repair parts in their original containers until ready for use.
5. Use static ground straps to discharge repair personnel.
6. Use conductive foam or anti-static containers to store replacement or removed IC's.
7. Remove plastic, vinyl and styrafoam products from the work area.
8. Do not slide static sensitive devices over any surface.
9. Use only anti-static type solder removal tools.
10. Use grounded tip soldering irons.

CAUTION

Avoid shorting across electrical conductors during TROUBLESHOOTING. Damage to circuitry in the Y2002 or the 2180A could otherwise result.

Troubleshooting for the Y2002 consists of the tabular flow chart provided in Table 3. When a step on the flow chart is completed, check for a decision transfer. If no decision is required, perform the next step of the table in sequence.

PARTS LIST

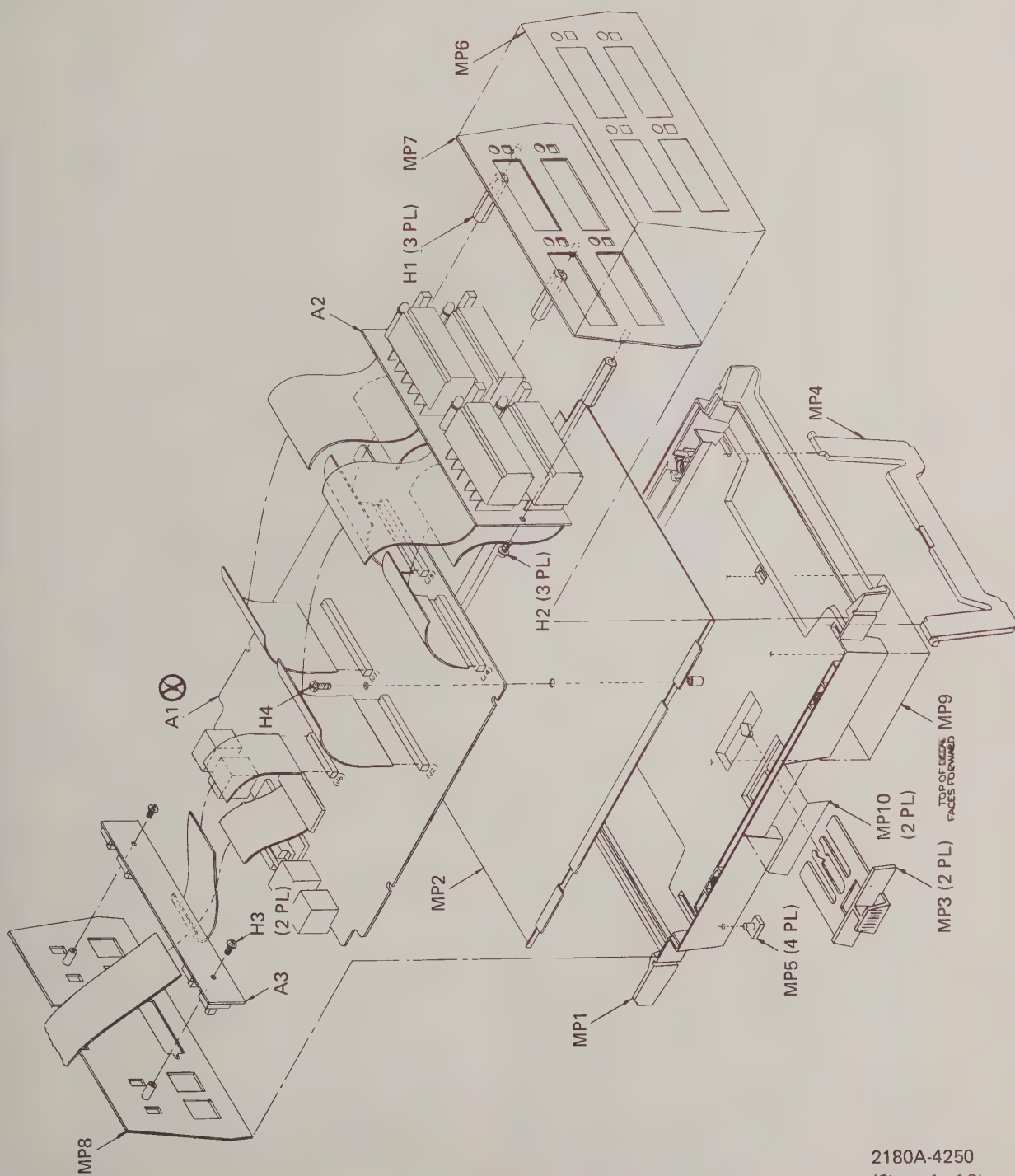
A detailed parts breakdown for the Y2002 is provided in Table 4. Refer to Section 5 of the 2180A Instruction Manual for specific parts ordering information.

Table 3. Y2002 Troubleshooting Guide

STEP NO.	ACTION	Go to the step number given for correct response	
		YES	NO
1	Check $\overline{\text{DATA}}$, $\overline{\text{DCLK}}$, $\overline{\text{WRT}}$ $\overline{\text{ADR}}$, and $\overline{\text{WRT}}$ to see if they are toggling.	3	2
2	Check cable for continuity and replace if necessary.		
3	Check (U9, 1), (U9, 13), (U10, 13) and (U10, 1) to see if they are toggling.	5	4
4	Replace defective component.		
5	Check U11, U6, U7, and U8.	7	6
6	Replace defective part.		
7	Check for the proper bcd code at the output of the Thumbwheel switches.	9	8
8	Replace or repair switch.		
9	Check (U20, 1), (U26, 13), (U25, 1), (U25, 13), (U24, 1), (U24, 13), (U23, 1), (U23, 13), (U22, 1), (U21, 13), (U21, 1), (U20, 13), (U20, 1), (U19, 1), (U19, 13), (U18, 1), and (U18, 13) to see if they are toggling.	11	10
10	Replace defective part.		
11	Check U16, U17, and U27 to see if they are loading and shifting data.	13	12
12	Replace defective part.		
13	Check U8, U5, Q5 and Q6 to ensure that they are causing the data line to toggle.	15	14
14	Replace defective part.		
15	Are the limits relay, LEDs and latch/non-latch switches working properly?	22	16
16	Check U1, U2, U3, U4 and U5. U1 and U3 should be latching the appropriate limits data.	18	17
17	Replace defective component.		
18	Check Q1, Q2, Q3, Q4, Q7, Q8, Q9 and Q10.	20	19
19	Replace defective component.		
20	Check CR1, CR2, CR3, CR4, K1, K2, K3, K4, S1, S2, S3 and S4.	22	21
21	Replace defective component.		
22	END		

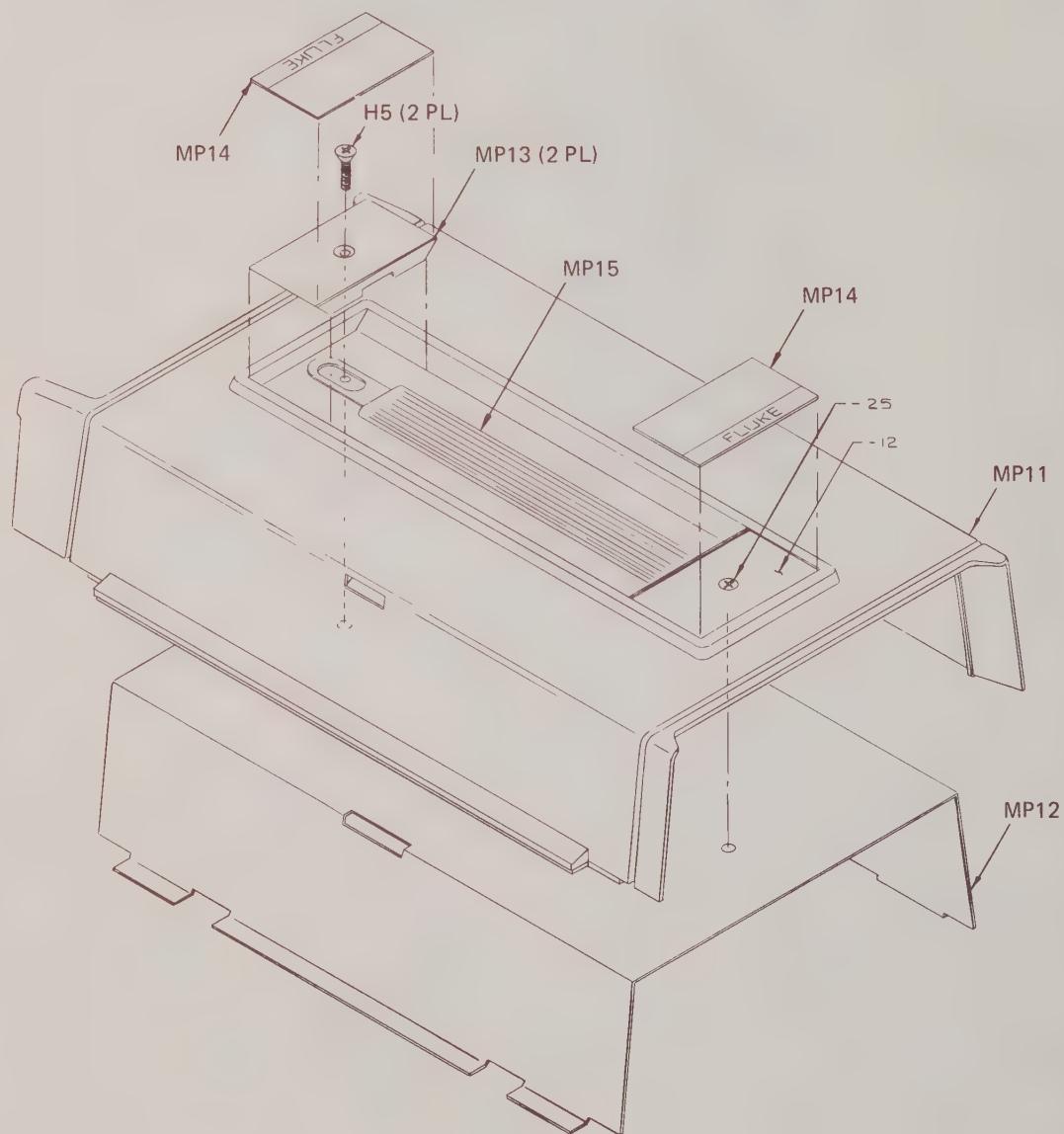
Table 4. Final Assembly

ITEM NO.	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO. OR TYPE	TOT QTY	REC QTY	USE CDE
A1	FINAL ASSY ALARMS OUTPUT (2180A-4250)	469635	89536	469635	1		
A2	ALARMS OUTPUT ASSY TESTED (2180A-4050T)	469767	89536	469767	1		
A3	THUMBWHEEL ASSY TESTED (2180A-4051T)	476135	89536	476135	1		
H1	ALARMS SWITCH ASSY (2180A-4052)	474403	89536	474403	3		
H2	HEX SPACER, 6X32 X 1.25 LG	152157	73734	19043	3		
H3	SCREW, PHP, 6-32 X 5/16	256156	89536	256156	2		
H4	SCREW, PHP, 4-40 X 1/4	288266	89536	288266	1		
H5	SCREW, PHP, 6-20 X 3/8	335158	89536	335158	2		
MP1	SCREW, FH, 6-32 X 5/8	454702	89536	454702	1		
MP2	BASE, STD	464404	89536	464404	1		
MP3	GUARD, BASE	467548	89536	467548	2		
MP4	LATCH	467555	89536	467555	1		
MP5	BAIL	467571	89536	467571	4		
MP6	FOOT, NON-SKID	473926	89536	473926	1		
MP7	DECAL, FRONT PANEL	472357	89536	472357	1		
MP8	FRONT PANEL	472340	89536	472340	1		
MP9	REAR PANEL	473918	89536	473918	1		
MP10	DECAL, BOTTOM	473652	89536	473652	2		
MP11	DECAL, BASE SIDES	454736	89536	454736	1		
MP12	COVER, "C" SIZE	464115	89536	464115	1		
MP13	GUARD, COVER "C"	467563	89536	467563	2		
MP14	RETAINER, HANDLE	473645	89536	473645	2		
MP15	DECAL, RETAINER	454751	89536	454751	1		
	HANDLE						



2180A-4250
(Sheet 1 of 2)

Figure 4. Final Assembly



2180A-4250
(Sheet 2 of 2)

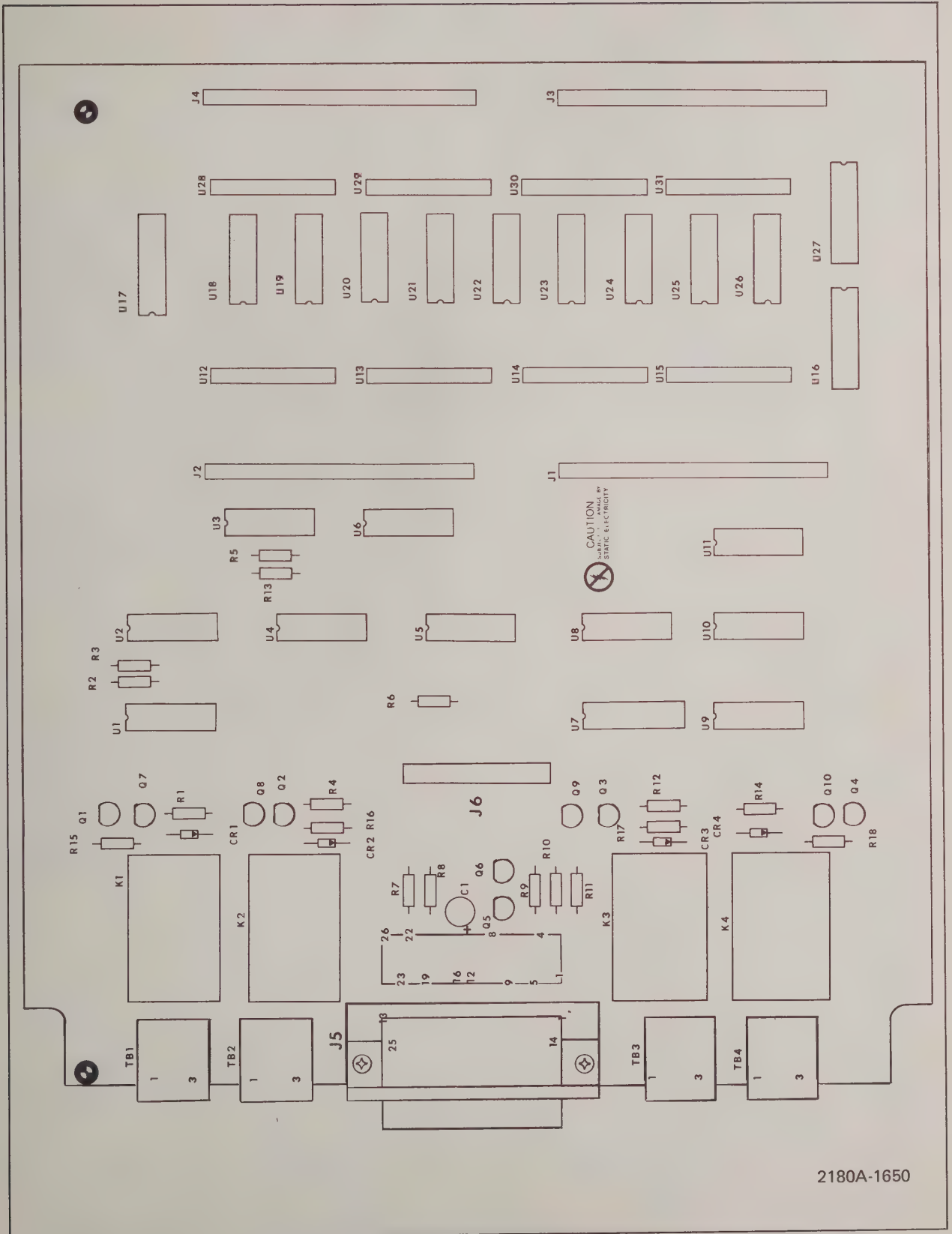
Figure 4. Final Assembly (cont)

Table 5. A1 Alarms Output Assembly

ITEM NO.	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO. OR TYPE	TOT QTY	REC QTY	USE CDE
A1	⊗ ALARMS OUTPUT ASSY (2180A-4050) FIGURE 5						
C1	CAP, TA, 10UF +/-20%, 20V	330662	56289	196D106X0020KA1	1		
CR1	DIODE, HI SPEED SWITCHING	203323	07910	1N4448	4		
CR2	DIODE, HI SPEED SWITCHING	203323	07910	1N4448	REF		
CR3	DIODE, HI SPEED SWITCHING	203323	07910	1N4448	REF		
CR4	DIODE, HI SPEED SWITCHING	203323	07910	1N4448	REF		
H1	WASHER, FLAT	147728	73734	1402	2		
H2	LOCKWASHER	LL0395	89536	110395	2		
H3	PRESS NUT, 4-40	380196	24347	KF2-440	2		
H4	SCREW, 4-40 X 3/8	152124	73734	19024	2		
J1	SOCKET	443069	00779	1-583773-0	4		
J2	SOCKET	443069	00779	1-583773-0	REF		
J3	SOCKET	443069	00779	1-583773-0	REF		
J4	SOCKET	443069	00779	1-583773-0	REF		
J5	CONNECTOR	461996	00779	206584-1	1		
J6	SOCKET	478610	00779	583773-4	1		
K1	RELAY	474346	77569	28Z111ZZ-0193			
K2	RELAY	474346	77569	28Z111ZZ-0193	REF		
K3	RELAY	474346	77569	28Z111ZZ-0193	REF		
K4	RELAY	474346	77569	28Z111ZZ-0193	REF		
Q1	TRANSISTOR, SI, NPN	218396	04713	2N3904	9		
Q2	TRANSISTOR, SI, NPN	218396	04713	2N3904	REF		
Q3	TRANSISTOR, SI, NPN	218396	04713	2N3904	REF		
Q4	TRANSISTOR, SI, NPN	218396	04713	2N3904	REF		
Q5	TRANSISTOR, SI, NPN	218396	04713	2N3904	REF		
Q6	TRANSISTOR, SI, PNP	195974	04713	2N3906	1		
Q7	TRANSISTOR, SI, NPN	218396	04713	2N3904	REF		
Q8	TRANSISTOR, SI, NPN	218396	04713	2N3904	REF		
Q9	TRANSISTOR, SI, NPN	218396	04713	2N3904	REF		
Q10	TRANSISTOR, SI, NPN	218396	04713	2N3904	REF		
R1	RES, DEP CAR, 20K +/-5%, 1/4W	441477	80031	CR251-4-6P20KT	4		
R2	RES, DEP CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10KT	9		
R3	RES, DEP CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10KT	REF		
R4	RES, DEP CAR, 20K +/-5%, 1/4W	441477	80031	CR251-4-6P20KT	REF		
R5	RES, DEP CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10KT	REF		
R6	RES, DEP CAR, 100K +/-5%, 1/4W	348920	80031	CR251-4-5P100KT	1		
R7	RES, DEP CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10KT	REF		
R8	RES, DEP CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10KT	REF		
R9	RES, DEP CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10KT	REF		
R10	RES, DEP CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10KT	REF		
R11	RES, DEP CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10KT	REF		
R12	RES, DEP CAR, 20K +/-5%, 1/4W	441477	80031	CR251-4-6P20KT	REF		
R13	RES, DEP CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10KT	REF		
R14	RES, DEP CAR, 20K +/-5%, 1/4W	441477	80031	CR251-4-6P20KT	REF		
R15	RES, DEP CAR, 2.2K +/-5%, 1/4W	343400	80031	CR251-4-5P2K2T	4		
R16	RES, DEP CAR, 2.2K +/-5%, 1/4W	343400	80031	CR251-4-5P2K2T	REF		
R17	RES, DEP CAR, 2.2K +/-5%, 1/4W	343400	80031	CR251-4-5P2K2T	REF		
R18	RES, DEP CAR, 2.2K +/-5%, 1/4W	343400	80031	CR251-4-5P2K2T	REF		
TB1	TERMINAL BLOCK	479014	89536	479014	4		

Table 5. A1 Alarms Output Assembly (cont)

ITEM NO.	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO. OR TYPE	TOT QTY	REC QTY	USE CDE
TB2	TERMINAL BLOCK	479014	89536	479014	REF		
TB3	TERMINAL BLOCK	479014	89536	479014	REF		
TB4	TERMINAL BLOCK	479014	89536	479014	REF		
U1	IC, DUAL D FLIP FLOP	340117	04713	MC14013L	2		1
U2	⊗ IC, COS/MOS, TRIPLE 3 INPUT NOR GATES	355180	04713	MC14025CP	2		1
U3	IC, DUAL D FLIP FLOP	340117	04713	MC14013L	REF		
U4	⊗ IC, COS/MOS, QUAD 2 INPUT NOR GATES	355172	04713	MC14001CP	2		1
U5	⊗ IC, COS/MOS, TRIPLE 3 INPUT NOR GATES	355180	04713	MC14025CP	REF		
U6	⊗ IC, COS/MOS, QUAD 2 INPUT NOR GATES	355172	04713	MC14001CP	REF		
U7	⊗ IC, CMOS, DUAL 4 BIT STATIC SHIFT REG	340125	04713	MC14015BCP	1		1
U8	⊗ IC, CMOS, HEX INVERTER	404681	04713	MC1406BCP	1		1
U9	⊗ IC, CMOS DUAL 4 INPUT POS NAND GATE	355206	04713	MC14012CP	12		3
U10	⊗ IC, CMOS DUAL 4 INPUT POS NAND GATE	355206	04713	MC14012CP	REF		
U11	⊗ IC, CMOS DUAL 4 INPUT POS NAND GATE	355206	04713	MC14012CP	REF		
U12	IC, RES NETWORK, 100K	461038	89536	461038	8		2
U13	IC, RES NETWORK, 100K	461038	89536	461038	REF		
U14	IC, RES NETWORK, 100K	461038	89536	461038	REF		
U15	IC, RES NETWORK, 100K	461038	89536	461038	REF		
U16	⊗ IC, CMOS 8 STAGE STATIC SHIFT REG	380766	02735	CD4021AE	3		1
U17	⊗ IC, CMOS 8 STAGE STATIC SHIFT REG	380766	02735	CD4021AE	REF		
U18	⊗ IC, CMOS DUAL 4 INPUT POS NAND GATE	355206	04713	MC14012CP	REF		
U19	⊗ IC, CMOS DUAL 4 INPUT POS NAND GATE	355206	04713	MC14012CP	REF		
U20	⊗ IC, CMOS DUAL 4 INPUT POS NAND GATE	355206	04713	MC14012CP	REF		
U21	⊗ IC, CMOS DUAL 4 INPUT POS NAND GATE	355206	04713	MC14012CP	REF		
U22	⊗ IC, CMOS DUAL 4 INPUT POS NAND GATE	355206	04713	MC14012CP	REF		



2180A-1650

Figure 5. A1 Alarms Output Assembly

Table 6. A2 Thumbwheel Assembly

ITEM NO.	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO. OR TYPE	TOT QTY	REC QTY	USE CDE
A2	THUMBWHEEL ASSY (2180A-4050)						
A2A1	LED STANDOFF ASSY (2180A-4260)	472548	89536	472548	4		
CR1	LED	385914	03508	SSL-22	4		
CR2	LED	385914	03508	SSL-22	REF		
CR3	LED	385914	03508	SSL-22	REF		
CR4	LED	385914	03508	SSL-22	REF		
R1	RES, DEP CAR, 240 +/-5%, 1/4W	376624	80031	CR251-4-5P240ET	4		
R2	RES, DEP CAR, 240 +/-5%, 1/4W	376624	80031	CR251-4-5P240ET	REF		
R3	RES, DEP CAR, 240 +/-5%, 1/4W	376624	80031	CR251-4-5P240ET	REF		
R4	RES, DEP CAR, 240 +/-5%, 1/4W	376624	80031	CR251-4-5P240ET	REF		
S1	THUMBWHEEL SWITCH	472811	53985	ISO1638	24		
S2	THUMBWHEEL SWITCH	472811	53985	ISO1638	REF		
S3	THUMBWHEEL SWITCH	472811	53985	ISO1638	REF		
S4	THUMBWHEEL SWITCH	472811	53985	ISO1638	REF		
S5	THUMBWHEEL SWITCH	472811	53985	ISO1638	REF		
S6	THUMBWHEEL SWITCH	472811	53985	ISO1638	REF		
S7	PUSHBUTTON, BLUE	472332	89536	472332	4		
	SWITCH, COVER	401299	89536	401299	4		
	SWITCH ACTUATOR	412106	89536	412106	4		
	SWITCH CONTACT SPRING	414516	00779	62312	4		
	SWITCH CONTACT	416875	00779	62313	4		
S8	THUMBWHEEL SWITCH	472811	53985	ISO1638	REF		
S9	THUMBWHEEL SWITCH	472811	53985	ISO1638	REF		
S10	THUMBWHEEL SWITCH	472811	53985	ISO1638	REF		
S11	THUMBWHEEL SWITCH	472811	53985	ISO1638	REF		
S12	THUMBWHEEL SWITCH	472811	53985	ISO1638	REF		
S13	THUMBWHEEL SWITCH	472811	53985	ISO1638	REF		
S14	PUSHBUTTON, BLUE	472332	89536	472332	REF		
	SWITCH, COVER	401299	89536	401299	REF		
	SWITCH ACTUATOR	412106	89536	412106	REF		
	SWITCH CONTACT SPRING	414516	00779	62312	REF		
	SWITCH CONTACT	416875	00779	62313	REF		
S15	THUMBWHEEL SWITCH	472811	53985	ISO1638	REF		
S16	THUMBWHEEL SWITCH	472811	53985	ISO1638	REF		
S17	THUMBWHEEL SWITCH	472811	53985	ISO1638	REF		
S18	THUMBWHEEL SWITCH	472811	53985	ISO1638	REF		
S19	THUMBWHEEL SWITCH	472811	53985	ISO1638	REF		
S20	THUMBWHEEL SWITCH	472811	53985	ISO1638	REF		
S21	PUSHBUTTON, BLUE	472332	89536	472332	REF		
	SWITCH, COVER	401299	89536	401299	REF		
	SWITCH ACTUATOR	412106	89536	412106	REF		
	SWITCH CONTACT SPRING	414516	00779	62312	REF		
	SWITCH CONTACT	416875	00779	62313	REF		
S22	THUMBWHEEL SWITCH	472811	53985	ISO1638	REF		
S23	THUMBWHEEL SWITCH	472811	53985	ISO1638	REF		
S24	THUMBWHEEL SWITCH	472811	53985	ISO1638	REF		
S25	THUMBWHEEL SWITCH	472811	53985	ISO1638	REF		
S26	THUMBWHEEL SWITCH	472811	53985	ISO1638	REF		
S27	THUMBWHEEL SWITCH	472811	53985	ISO1638	REF		

Table 6. A2 Thumbwheel Assembly (cont)

ITEM NO.	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO. OR TYPE	TOT QTY	REC QTY	USE CDE
S28	PUSHBUTTON, BLUE	472332	89536	472332			REF
	SWITCH, COVER	401299	89536	401299			REF
	SWITCH ACTUATOR	412106	89536	412106			REF
	SWITCH CONTACT SPRING	414516	00779	62312			REF
	SWITCH CONTACT	416875	00779	62313			REF
W1	CABLE, 22 PIN, 3-INCH	474189	00779	2-86943-1	2		
W2	CABLE, 22 PIN, 5-INCH	474197	00779	2-86946-1	2		

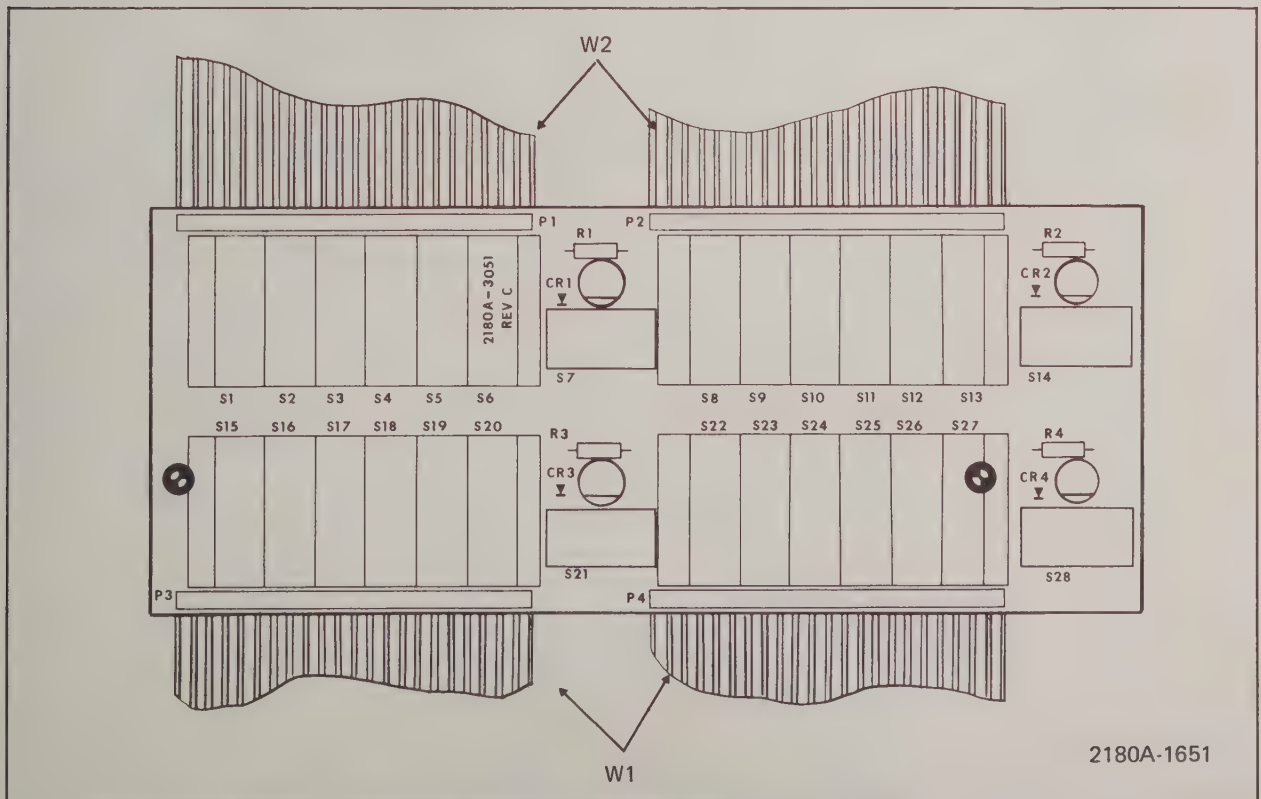
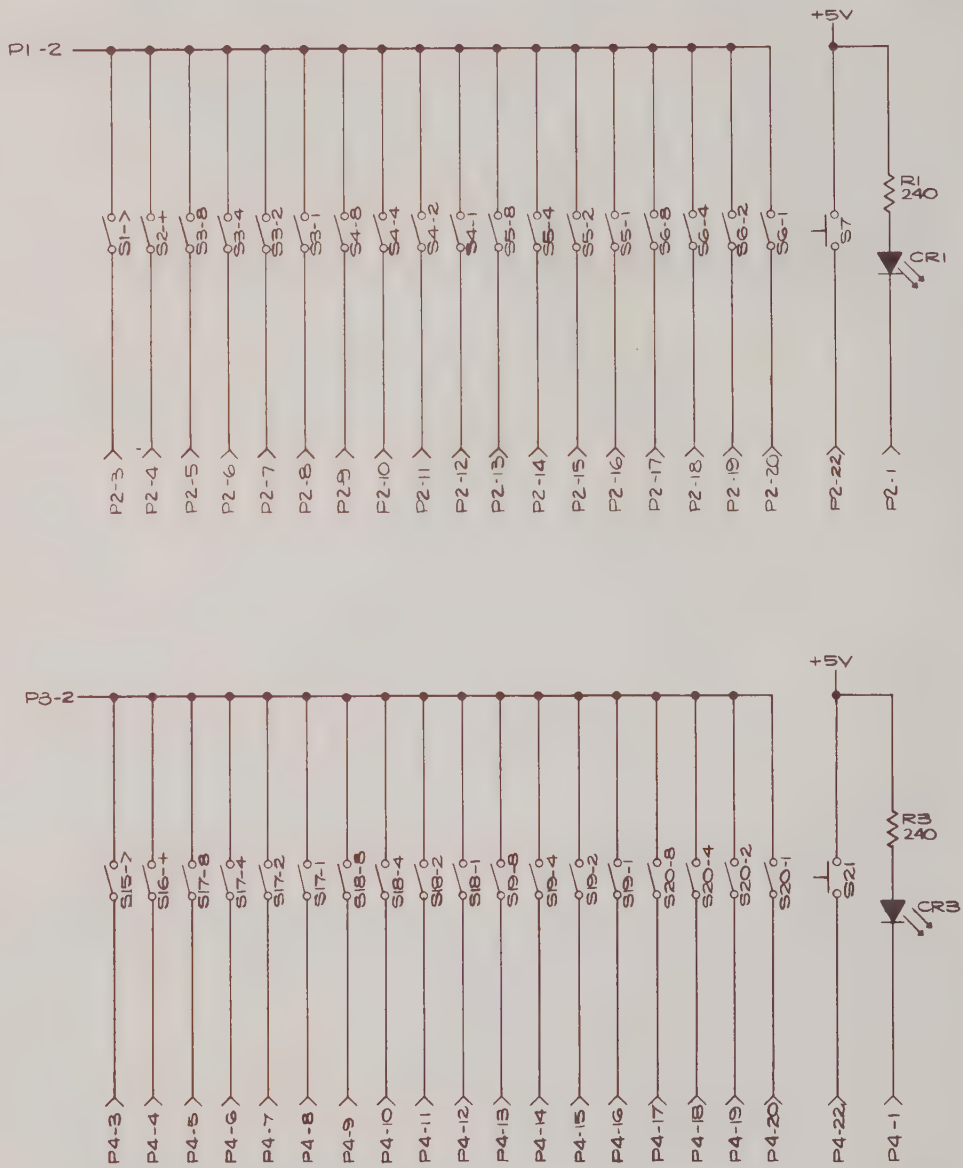
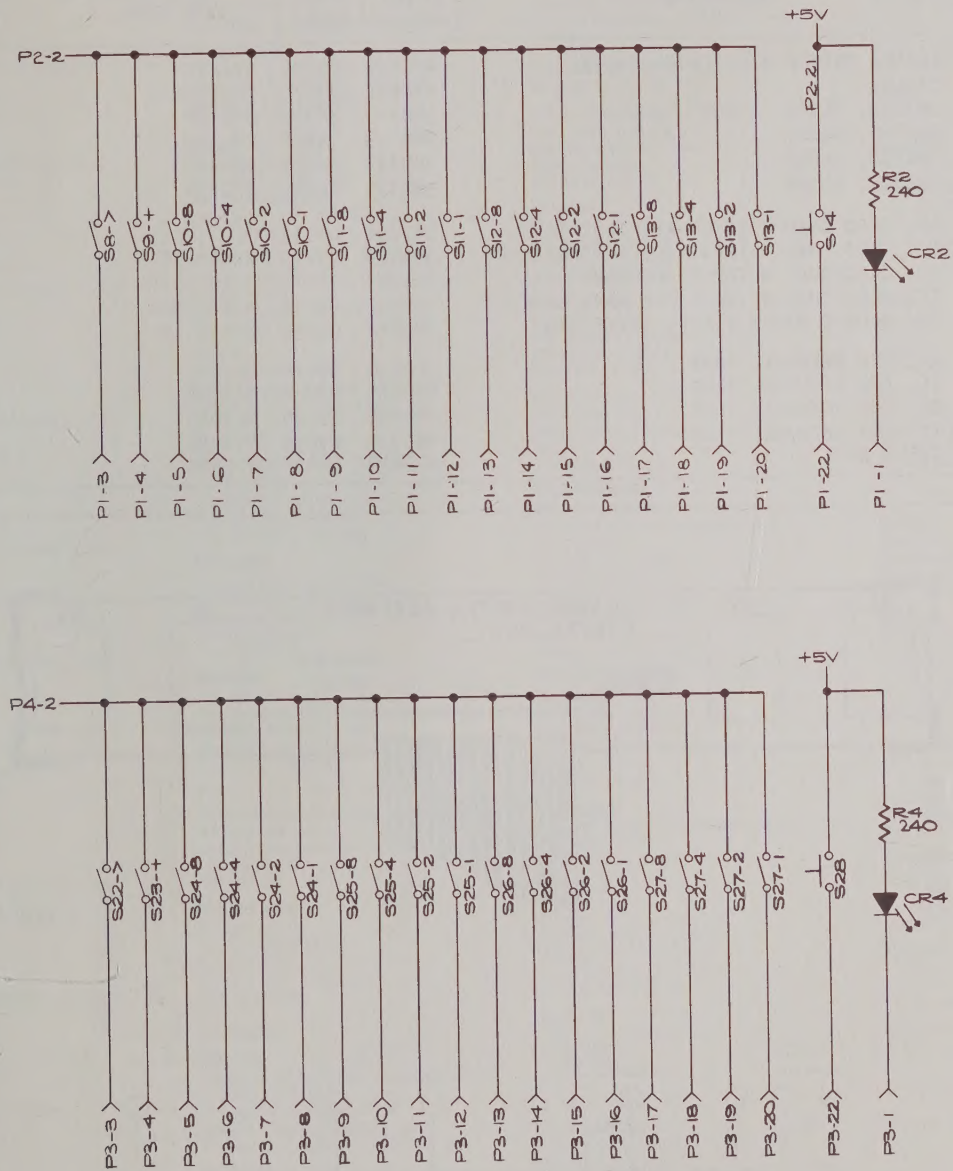


Figure 6. A2 Thumbwheel Assembly



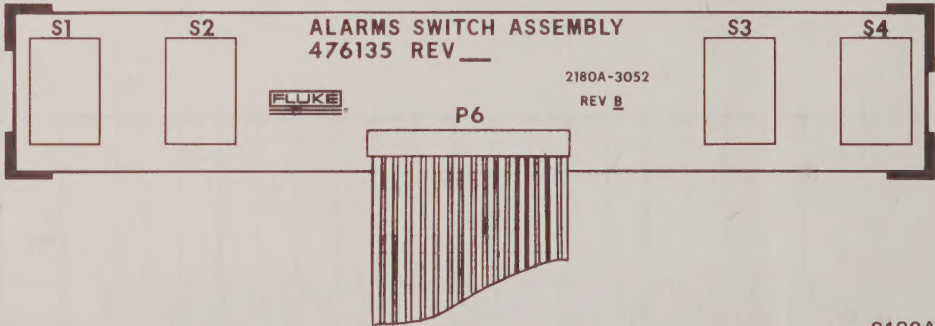


2180A-1051

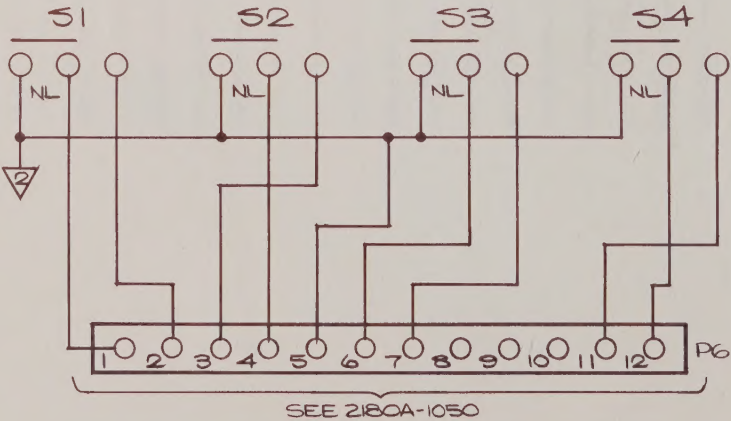
Figure 6. A2 Thumbwheel Assembly (cont)

Table 7. A3 Alarms Switch Assembly

ITEM NO.	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO. OR TYPE	TOT QTY	REC QTY	USE CDE
A3	ALARMS SWITCH ASSY (2180A-4052)	476135	89536	476135	1		
P6	CABLE	478602	00779	1-86945-1	1		
S1	SWITCH, SLIDE	380113	34828	GF-124	4		
S2	SWITCH, SLIDE	380113	34828	GF-124	REF		
S3	SWITCH, SLIDE	380113	34828	GF-124	REF		
S4	SWITCH, SLIDE	380113	34828	GF-124	REF		
U23	IC, CMOS DUAL 4 INPUT POS NAND GATE	355206	04713	MC14012CP	REF		
U24	IC, CMOS DUAL 4 INPUT POS NAND GATE	355206	04713	MC14012CP	REF		
U25	IC, CMOS DUAL 4 INPUT POS NAND GATE	355206	04713	MC14012CP	REF		
U26	IC, CMOS DUAL 4 INPUT POS NAND GATE	355206	04713	MC14012CP	REF		
U27	IC, CMOS 8 STAGE STATIC SHIFT REG	380766	02735	CD4021AE	REF		
U28	IC, RES NETWORK, 100K	461038	89536	461038	REF		
U29	IC, RES NETWORK, 100K	461038	89536	461038	REF		
U30	IC, RES NETWORK, 100K	461038	89536	461038	REF		
U31	IC, RES NETWORK, 100K	461038	89536	461038	REF		
W1	CABLE ASSY	473439	89536	473439	1		



2180A-1652



NOTES:

- 1. DENOTES DIGITAL COMMON. DIGITAL COMMON IS -15V WITH RESPECT TO ANALOG COMMON.

2180A-1052

Figure 7. A3 Alarms Switch Assembly

TECHNICAL SERVICE CENTERS

United States

California

Burbank

Fluke Western Technical Center
2020 N. Lincoln St.
Zip: 91504
Tel. (213) 849-4641

Santa Clara

Fluke Western Technical Center
2359 De La Cruz Blvd.
Zip: 95050
Tel. (408) 985-1200

Colorado

Denver

Fluke Southwestern Technical Center
1980 S. Quebec St.
Unit 4
Zip: 80231
Tel. (303) 750-1228

Florida

Orlando

Fluke S.E. Technical Center
P.O. Box 6578
940 N. Fern Creek Ave
Zip: 32803
Tel. (305) 896-2296

Illinois

Rolling Meadows

Fluke Midwestern Technical Center
1400 Hicks Road
Zip: 60008
Tel. (312) 398-5800

Maryland

Kensington

Fluke Midwestern Technical Center
11501 Huff Court
Zip: 20795
Tel. (301) 881-6155

Massachusetts

Waltham

Fluke N.E. Technical Center
244 Second Avenue
Zip: 02154
Tel. (617) 890-1600

Minnesota

Minneapolis

Fluke Midwestern Technical Center
10800 Lyndale Ave. So.
Zip: 55420
Tel. (612) 884-4541

New Jersey

Clifton

Fluke Eastern Technical Center
460 Colfax Ave.
Zip: 07013
Tel. (201) 778-4040

North Carolina

Greensboro

Fluke S.E. Technical Center
P.O. Box 9619
1310 Beaman Place
Zip: 27408
Tel. (919) 273-1918

Washington

Mountlake Terrace

John Fluke Mfg. Co., Inc.
7001 - 220th Ave. S.W.
Zip: 98043
Tel. 774-2206

Canada

Alberta

Calgary

Fluke Canadian Technical Center
3829 - 12th St. N.E.
Zip: T2E 6M5
Tel. (403) 276-9658

Ontario

Mississauga

Fluke Canadian Technical Center
6503 Northam Drive
Zip: L4V 1J5
Tel. (416) 678-1500

International

Central & South America

Argentina

Coasin S.A.
Virrey del Pino 4071
Buenos Aires, Argentina
Te. 523185

Brazil

Arotec S.A.
Industria e Comercio
Av. Pacaembu 811
Sao Paulo S.P., Brazil
Tel. 67-2392

Arotec S.A.

Av. Rio Branco, 277
Grupo 1309
Rio de Janeiro, R.J., Brazil
Tel. 242-9776

Chile

Coasin Chile Ltda.
Ismael Valdes Vergara 336 of. 41
Casilla 14588 - Correo 21
Santiago, Chile
Tel. 396713

Columbia

Asistec Limitada
Carrera 7, N°83-40, Int 10
Bogota DE, Columbia
Tel. 257-2675, 257-2898

Ecuador

Protec Coasin CIA, Ltda.
Ing Jaime Jaramillo
Apartado 228A
Quito, Ecuador
Tel. 526759

Mexico

C.J. Christensen S.A. de C.V.
Instrumentos Electronicos de Medicion
Melchor Ocampo 150-8
Mexico 4, D.F., Mexico
Tel. (905) 5352258

Peru

Importaciones & Representaciones
Electronicas S.A.
Avda Franklin D. Roosevelt 105
Lima 1, Peru
Tel. 288650

Venezuela

Coasin C.A.
Apdo. Postal 50939
Sabana Grande No. 1
Caracas 105, Venezuela
Tel. 782-9109

Europe

Austria

Walter Reikirsch Elektronische Gerate
GMBH & Co. KG
Gottfried-Keller-Gasse 2/9
A-1030 Vienna, Austria
Tel. (0222) 734294

Belgium

C.N. Rood S.A.
37 Place de Jamblinne de Meux
B-1040 Brussels, Belgium
Tel. (02) 27352135

Denmark

Tage Olsen A/S
Teglvaerksgade 37
DK-2100 Copenhagen 0
Denmark
Tel. (01) 294800

Finland

OY Findip AB
Teollisuystie 7
02700 Kauniainen
Finland
Tel. (080) 502255

France

M.B. Electronique S.A.
29, Rue Emile Duclaux
92150, Suresnes, France
Tel. 7723111 (108)

German Federal Republic

Fluke (Deutschland) GMBH

Meineckestrasse 53
4 Dusseldorf 30
West Germany
Tel. (0211) 450831

Fluke (Deutschland) GMBH

Mutschelestrasse 1
8000 Munich 80
West Germany
Tel. (089) 433021

Greece

Hellenic Scientific Representations Ltd.
10 Nympheou Street
Athens 615, Greece
Tel. (021) 7792320

Italy

Sistrel S.p.A.
Via Giuseppe Armellini No. 37
00143 Rome, Italy
Tel. (06) 5915551

Sistrel S.p.A.

Via Timavo 66
20099 Sesto S. Gioranni (Milan)
Italy
Tel. (02) 2476693

Netherlands

C.N. Rood N.V.
Cort van der Lindenstraat 11-13
P.O. Box 42
Rijswijk ZH 2100
Tel. 070-996360

Fluke (Nederland) B.V.

P.O. Box 5053
Zevenheuvelenweg 53
Tilburg, Netherlands
Tel. (013) 673973

Norway

Morgenstjerne & Co. A/S
Konghellegate 3
P.O. Box 6688, Rodelokka
Oslo 5, Norway
Tel. 472356110

Portugal

Equipamentos De Laboratorio Ltda.
P.O. Box 1100
Lisbon-I, Portugal
Tel. (019) 976551

Spain

Hispano Electronica S.A.
Poligono Industrial Urtinas
Apartada de Correos 48
Alcorcon (Madrid) Spain
Tel. 09-3416194108

Sweden

Teleinstrument AB
P.O. Box 490
S-162 Vallingby 4
Sweden
Tel. 08-380370

Switzerland

Traco Electronic AG
Jenatschstrasse 1
8002 Zurich
Switzerland
Tel. (01) 2010711

United Kingdom

Fluke International Corporation
Garnet Close
Watford, WD2 4TT
England
Tel. 0923-33066

Africa, Asia & Australia

Australia

Elmeasco Instruments Pty Ltd.
P.O. Box 30
Concord, N.S.W.
Australia 2137
Tel. (02) 736-2888

Melbourne Branch Office
Elmeasco Instruments Pty Ltd.
P.O. Box 107
Mt. Waverly, VIC 3149
Australia
Tel. 233-4044

Hong Kong

Gilman & Co. Ltd.
P.O. Box 56
Hong Kong
Tel. 227011 (14)

India

Hinditron Services Pvt. Ltd.
69/A.L. Jagmohandas Marg
Bombay - 400 006, India
Tel. 365344

Indonesia

C.V. Cempaka Putih
P.O. Box 4328 JKT
JL. Kramat Pulo 33
Jakarta Pusat, Indonesia
Tel. 41332

Iran

Irantronic Company, Ltd.
20 Salm Road, Roosevelt Ave.
Tehran, Iran
Tel. 828294

Israel

R.D.T. Electronics Engineering Ltd.
P.O. Box 75
46 Sokolov Street
Ramat Hasharon 47235
Israel
Tel. 483211

Korea

Shin Han Scientific Co., Ltd.
International P.O. Box 1250
Seoul, Korea
Tel. 76-2761

Japan

John Fluke Mfg. Co., Inc.
Japan Branch
1 Higashikata Machi
Midori-Ku
Yokohama 226, Japan
Tel. (045) 473-5428, 473-5429

Malaysia

O'Connor's (PTE) Ltd.
P.O. Box 91
Petaling Jaya, Selangor
West Malaysia
Tel. 51563

New Zealand

W & K McLean Ltd.
P.O. Box 3097
Auckland, New Zealand
Tel. 587-037

Nigeria

Mofat Engineering Co., Ltd.
P.O. Box 6369
Lagos, Nigeria

Singapore

O'Connor's (PTE) Ltd.
98 Pasir Panjang Road
Singapore 5, Singapore
Tel. 637944

South Africa

Fluke S.A. (PTY) Ltd.
P.O. Box 39797
Bramley 2018
Republic of South Africa

Taiwan

Tatung Company
22 Chungshan North Road
3rd Section
Taipei, Taiwan
Republic of China
Tel. 5215252

Turkey

Erkman Elektronik Aletler
Necatibey Cad. 92/2
Karakoy/Istanbul
Turkey
Tel. 441546

For areas not listed, contact the
Fluke Technical Center nearest
you or contact Fluke directly at
Mountlake Terrace, WA.

TECHNICAL SERVICE CENTERS

MP MASTER /



MA30409